



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Teresa Grocela Rocha et al.

Serial No.: 10/743,646

Filed: December 22, 2003

For: CATALYST SYSTEM AND
METHOD FOR THE REDUCTION
OF NO_x

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Group Art Unit: 1754

Examiner: Strickland, Jonas N.

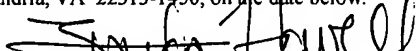
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37 C.F.R. 1.8

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October 2, 2006


Lynda Howell

REPLY BRIEF PURSUANT TO 37 C.F.R. §§ 41.41

This Reply Brief is being filed in response to the Examiner's Answer mailed on July 31, 2006. This Reply Brief addresses the Examiner's misunderstanding of the technology, as well as the Examiner's continuing pattern of misapplying the teachings of the prior art beyond its reasonable limits in order to reach the subject matter taught and claimed by Appellants. In the interest of brevity in this Reply Brief, Appellants respectfully ask that the Board carefully consider the arguments set forth in the previously-filed Appeal Brief.

- a. Okimura does not suggest catalytic metal oxides such as gallium oxide or indium oxide in the catalyst system.

Okimura discloses a catalytic system comprising a complex oxide as the main phase. The complex oxide has a **spinel structure** and contains Al, Ga and Zn. As well known in the art, metal oxides with spinel structures comprise *plurality of metals* with a very specific ratio of metal to oxygen. Okimura merely uses Ga oxides *as an ingredient* for the final product of

complex oxides which form the main phase of the catalyst. Therefore, the final product of the complex oxide of the resulting spinel structure present in the catalyst system does not include Ga oxide. Ga oxide is merely a source for one of the multiple metals (Ga) present in the final complex oxide.

In the Examiner's Answer, the Examiner argued that the admission by the Appellants that Ga is an ingredient to the final product of complex oxide is "contradictory". The Appellants again submit that the final product of the complex oxide does not contain gallium oxide or indium oxide as claimed in independent claims 1 and 15 of the present application. Ga oxide is merely an ingredient to reach at the final product of a complex oxide. Appellants see nothing contradictory in the conversion of the initial products of Okimura to the final product, that itself does not include the claimed composition.

The Examiner's assertion was that the lack of a spinel structure, or any particular structure is not recited in the pending claims. Appellants submit that the Examiner has completely missed the point of the Appellants' argument. The purpose of discussing the spinel structure of Okimura was not to point out that the claims in the present application do not have spinel structure, but to explain the fundamental difference between a spinel structure as described by Okimura as the main phase in the catalyst and the presence in the catalyst of gallium oxide as recited in the present claims.

In the ternary phase diagram (shown in FIG. 1 of Okimura), the hatched portion clearly shows the operating ranges of the complex oxides described by Okimura. Any composition within the hatched region will include all three metals, namely zinc, aluminum and gallium to arrive at the complex oxide of the spinel structure. Okimura discloses that:

[w]hen the amount of ZnO becomes 50 mol% or larger, crystals having other than spinel structure will be formed, resulting in potential deterioration in catalytic activity... Col. 3, lines 7-10.

Thus, Okimura clearly teaches that the properties of the spinel structures of the complex oxides are different by keeping the compositions of Zn, Al and Ga under some specific ranges. Therefore, the catalytic system described by Okimura is fundamentally different from the catalyst system claimed, and would not and could not function in a similar manner. Claims 1 and 15 therefore need not explicitly *exclude* complex oxides having spinel structures, as the claims affirmatively include gallium oxide, which the reference does not teach.

b. **Kepner and Park do not suggest the metal oxides of independent claims 1 and 15.**

The system described by Kepner is fundamentally different from the catalyst system of the present invention. The catalyst system of the present invention does not include either a binder or an adsorbent. Even more fundamentally, Kepner does not teach the use of the oxides recited in the pending independent claims, and the Examiner did not advance that it does.

Park describes a catalyst system including an oxide support material, and a metal promoter or dopant. However, Park neither discloses nor suggests use of a hydrocarbon as a reductant comprising at least 4 carbon atoms. The use of hydrocarbon comprising higher carbon content is not suggested by any of the cited references. Here again, Park fails to teach the oxides missing from Okimura and Kepner.

Given the fact that none of the references teaches at least the use of the recited oxides, the combination of Okimura, Kepner and Park cannot suggest or teach the catalyst system of the present claims.

The Examiner's rejection of dependent claims 13, 14 and 24-25 is improper because the rejection fails to establish a *prima facie* case of obviousness.

Balmer-Miller describes a NO_x after-treatment system. As described by Balmer-Miller, the reductant used for NO_x reduction are oxygenated hydrocarbons derived from the fuel source. The example of the fuel source is given as gasoline. Gasoline itself is not used as the reductant as claimed in claim 13 of the present application, but is merely used to derive the oxygenated reductant, which is finally used in the catalyst system to reduce NO_x. However, the use of

gasoline, hydrocarbon containing 8 carbon atoms, and other higher hydrocarbons as recited in claims 13-14 and 24-25 is neither suggested nor disclosed by Balmer-Miller.

In sum, the Examiner has failed to establish a *prima facie* case of obviousness for these additional reasons.

Conclusion

Based upon the above points of clarification in conjunction with the arguments made in the previously filed Appeal Brief, Appellants believe that the claims are clearly allowable over the cited art. The Examiner's rejections, therefore, cannot stand. Appellants respectfully request that the Board withdraw the outstanding rejections and pass the present application to allowance.

Respectfully submitted,

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